



## Overview of the FHWA Mobile Pavement Technology Centers



U.S. Department of Transportation  
**Federal Highway Administration**



100<sup>th</sup> Annual NESMEA  
Conference  
*October 15, 2024*

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Federal Highway  
Administration



# MCTC and Evolving Concrete Specifications



*NESMEA*

*October 15, 2024*

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U.S. Department of Transportation  
Federal Highway Administration

# Disclaimer

A decorative horizontal arrow graphic pointing to the right, composed of several overlapping arrow shapes in shades of blue and grey.

- Except for the statutes and regulations cited, the contents of this presentation do not have the force and effect of law and are not meant to bind the States or the public in any way. This presentation is intended only to provide information regarding existing requirements under the law or agency policies.
- Unless otherwise noted, FHWA is the source of all images in this presentation.



## Mobile Concrete Technology Center

- Funded by the Accelerated Implementation and Deployment of Pavement Technologies Program
- Unique
- Program evolves to meet stakeholder needs





**MCTC**  
MOBILE CONCRETE TECHNOLOGY CENTER

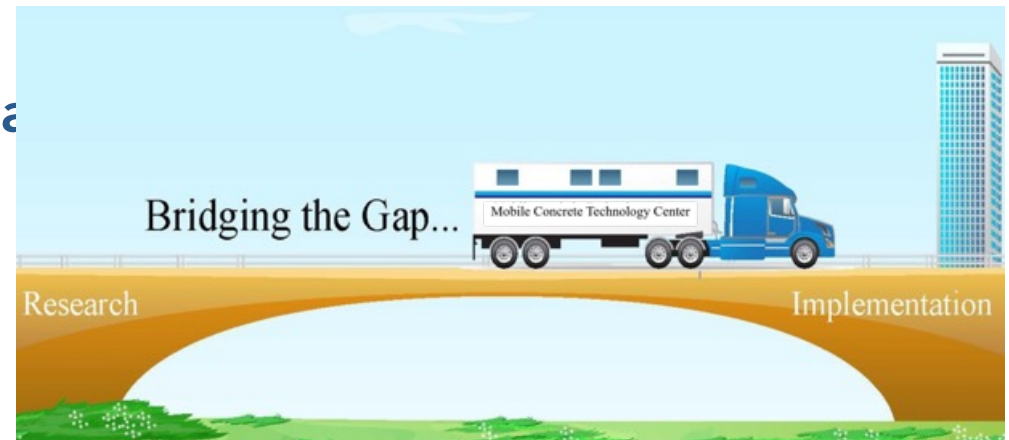
**SURFACE RESISTIVITY TEST**  
Assesses Permeability

The Surface Resistivity test evaluates the electrical resistance to provide a rapid indication of surface resistance to chloride ion penetration.

- This easy to use test offers advantages including rapid testing, nondestructive method, and compared to the traditional methods.
- > Test takes less than two minutes.
- > Measures resistivity to provide a rapid indication of surface resistance to chloride ion penetration.
- > Surface Resistivity-AA (AASHTO T 358)
- > Bulk Resistivity-AASHTO (AASHTO TP 119)

# MCTC Program Mission

- Implement new & under-used concrete technologies
- Demonstrate benefits of performance specifications in both agency quality assurance (QA) programs & industry quality control (QC) applications
- Advance States' concrete programs
  - Specification review
  - Technical assistance
  - Training
  - Troubleshooting
- Better concrete

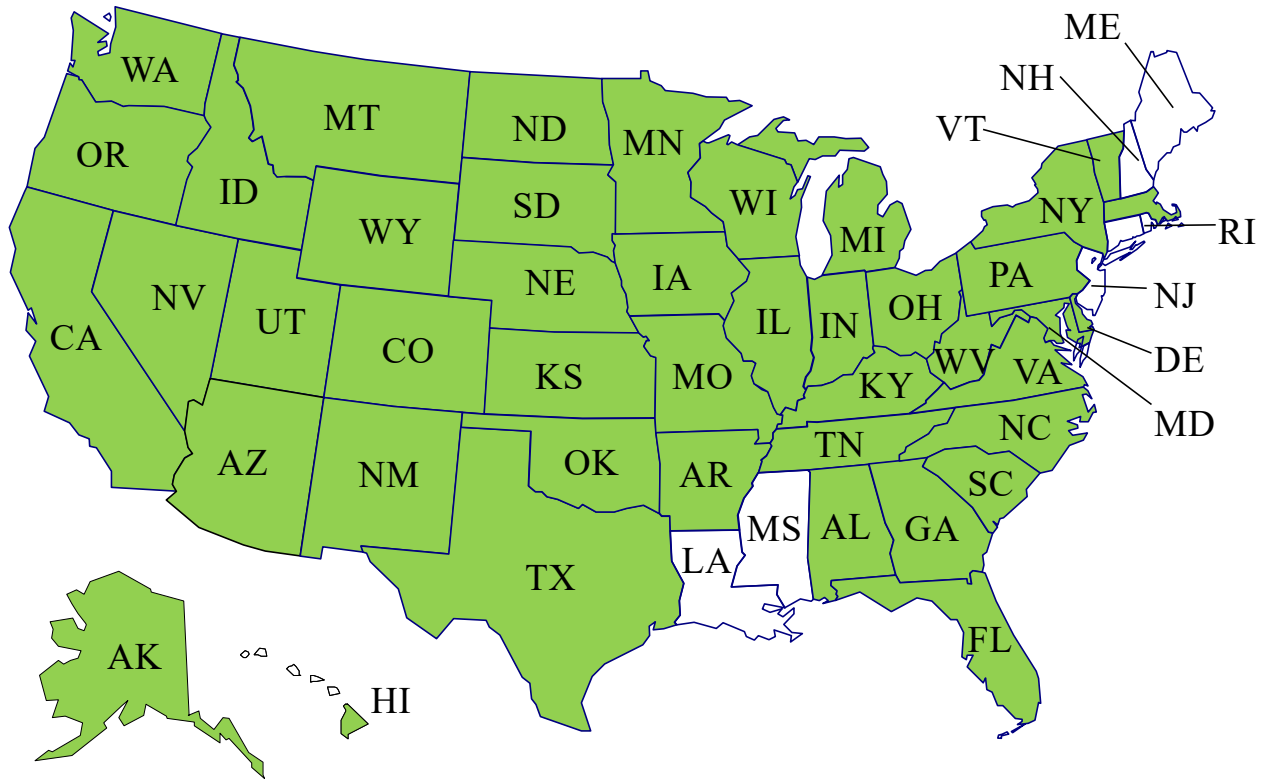


# Program Activities

- Field visits to active construction projects
- Quality in the Concrete Paving Process workshops
- Equipment Loan Program
- Technical assistance/specification reviews
- Conferences/Open houses
- Support TFHRC and other research
- Publications to promote the FHWA concrete program and advance



# MCTC Field Visits (since 2008)





# Quality in the Concrete Paving Process Workshop

- Two-day workshop on concrete materials and construction
- Builds off data and observations from field visit and specification review
- Agency and industry participation (50/50)
- Goal: Action plan



# Equipment Loan Program

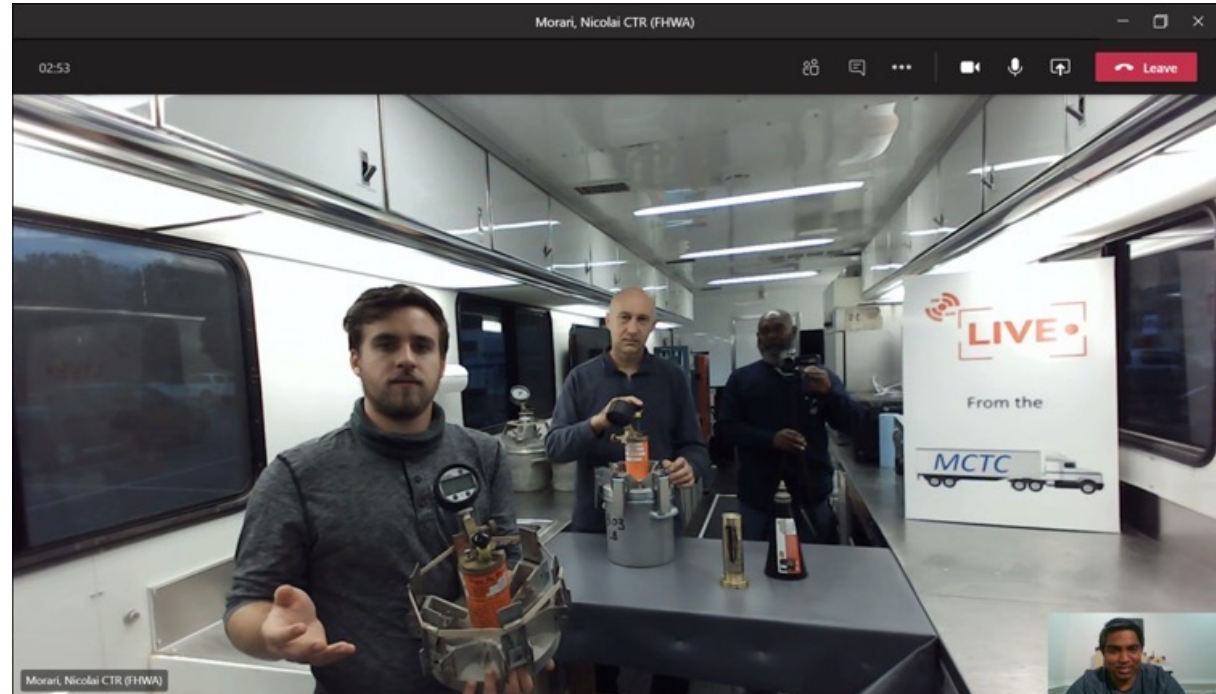
- Agencies or industry can borrow MCTC equipment
- MCTC staff will provide training, if desired
- PEM/AASHTO R101 focus
- Contact me/Jagan if interested



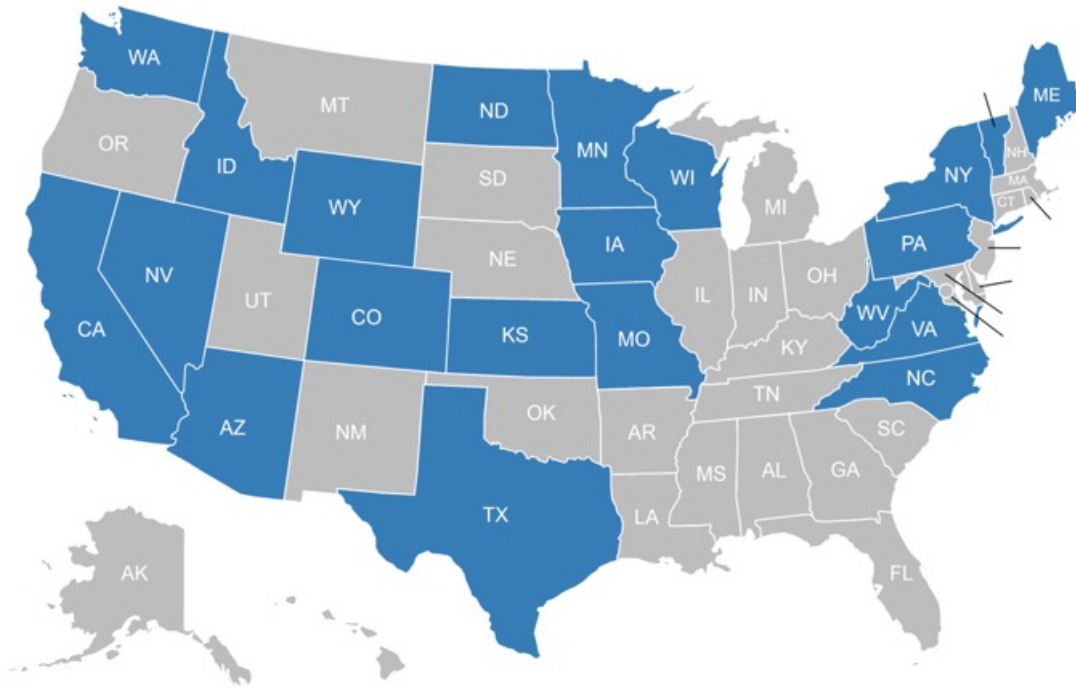
Use of PEM/PP 84 (AASHTO R101) is not a Federal requirement.

# “Live From the MCTC” Training/Workshops

- Super Air Meter (SAM)
- Surface/Bulk Resistivity
- Maturity
- Box Test/V-Kelly
- Semi-adiabatic calorimeter
- Phoenix (fresh water content)
- Pulse Induction Technology (MIT-SCAN-T3)
- MIT-DOWEL-SCAN
- HIPERPAV®
- Optimized Gradation software



# MCTC Virtual Sessions (2020-2021)



Created with mapchart.net

# Technology Tour



# College Program

- Practical Applications of Quality Control
- Concrete Testing Technologies
- FHWA Mobile Concrete Technology Center and Performance Engineered Mixtures



# College Program

## Completed

- Virginia Military Institute
- Ohio State University
- Ohio Northern University
- Case Western Reserve
- Clarkson University
- Rensselaer Polytechnic Institute
- University of Connecticut
- Cleveland State University
- Auburn University

## Planning

- University of Nebraska
- University of Wisconsin-Whitewater
- Purdue



# One Pager Series

- Use MCTC data and experiences
- Narrowly focused
- Meant to stir interest and point reader to resources

- 1<sup>st</sup>: Cement content
- 2<sup>nd</sup>: Optimized Mix Design
- 3<sup>rd</sup>: Cores vs. Cylinders
- 4<sup>th</sup>: NDT Pavement Thickness
- 5<sup>th</sup>: Tining/Surface Texture
- 6<sup>th</sup>: Surface Resistivity Test
- 7<sup>th</sup>: Maturity
- 8<sup>th</sup>: Curing
- 9<sup>th</sup>: SCM's
- 10<sup>th</sup>: Calorimetry
- 11<sup>th</sup>: Workability
- 12<sup>th</sup>: Air Entrainment
- 13<sup>th</sup>: Stringless Paving
- 14<sup>th</sup>: Water Reducing Admixtures



[www.fhwa.dot.gov/MCTC](http://www.fhwa.dot.gov/MCTC)





# 2025 Activities

## ➤ Project Site Visits

- Montana
- Georgia
- California
- Arkansas
- Puerto Rico
- Federal Lands

## ➤ Workshops

- Nevada
- Wisconsin
- Utah

## ➤ Technology Tours

- Texas
- Oregon
- Maryland

## ➤ University Days

- University of Nebraska
- University of Wisconsin

## ➤ Conferences

- TRB
- World of Concrete
- ACPA Annual Meeting
- ACPA—PA Chapter Annual Meeting
- ACI Fall Convention (MD)
- Eastern Federal Lands



# New MCTC!

- Currently under construction. Delivery expected by Christmas.
- Education and training friendly.
- Take advantage of what we have to offer!





U.S. Department of Transportation  
**Federal Highway Administration**

**MATC**  
MOBILE ASPHALT TECHNOLOGY CENTER

# Key Items from Recent Site Visits

**FHWA Mobile Asphalt Technology Center**

Unless otherwise noted, FHWA is the source for all images in this presentation.



Source: Getty Images

# Mobile Asphalt Technology Center (MATC) Program Goals

- Implement new & under-used asphalt lab and field evaluation technologies
- Demonstrate benefits of performance specification both agency quality assurance (QA) programs & industry quality control (QC) applications
- Advance asphalt programs in US via assistance:
  - Specification reviews
  - Technical assistance
  - Training
  - Troubleshooting unique challenges



# FHWA Asphalt Technology Deployment

- ▶ **Project Site Visits:** provide agencies and industry with first-hand exposure to new technologies (currently, 8 mixture tests, 4 materials tests, and 5 field tests)
- ▶ **Customized Training Workshops:** classroom and online training based on field test results and observations
- ▶ **Equipment Loan Program:** gain hands-on experience before making a resource commitment
- ▶ **Technical Guidance:** based on identified national trends to encourage agencies and industry to evaluate and improve their specifications and practices

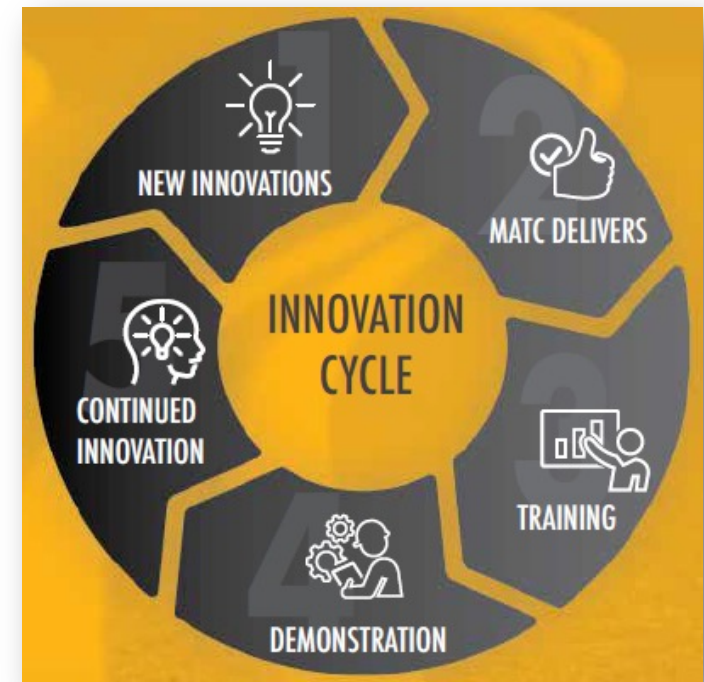


Image Source: FHWA

# Site Visit Logistics

Total Time: 12 months

On-Site Time: 3–4 weeks

- 1 KICKOFF MEETING**  
With State DOT, FHWA Div., SAPA, Industry, Academia, etc.
- ▶ 1.5-hr virtual overview of MATC program.

- 2 PLANNING MEETINGS TO DEVELOP SITE VISIT TEST PLAN**  
With State DOT, FHWA Div., SAPA, and Host Contractor.
- ▶ Starting 3–4 months prior (emails, calls, virtual meetings).

- 3 ON-SITE KICKOFF**  
With State DOT, FHWA Div., and Host Contractor.
- ▶ Typically held the week prior to or during first week on-site.

- 4 OPEN HOUSE**  
With State DOT, FHWA Div., Local/Tribal Agencies, Industry, Academia, etc.
- ▶ 1-day event while on-site with formal presentations and MATC tours and demos.

- 5 1-DAY ASPHALT 101 COURSE** (live or virtual)  
**1-HR LUNCH&LEARN WEBINARS** (virtual)  
Open to State and Local/Tribal Agencies, Industry, Academia, etc.
- ▶ Offered during 3–4 weeks while on-site.

- 6 SAMPLING/TESTING AND ON-SITE CLOSEOUT**  
With State DOT, FHWA Div., SAPA, and Host Contractor.
- ▶ 2–3 weeks at MATC lab and paving site.

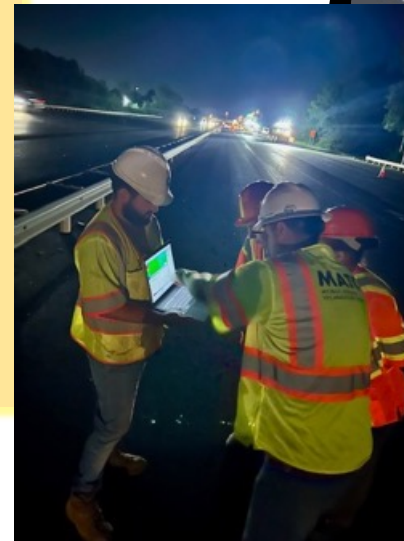
- 7 TECHNICAL REPORT AND SPECIFICATION REVIEW BRIEFING**  
With State DOT and FHWA Div.
- ▶ Delivered virtually within 90 days after departing site.

- 8 2-DAY QUALITY IN THE ASPHALT PAVING PROCESS WORKSHOP**  
Hosted by State DOT, with FHWA Div., SAPA, and Industry.
- ▶ To be held in person 6–9 months after site visit.

# Equipment Loan Program (66 loans in 29 states since 2020)

## Equipment loan includes:

- ▶ Pre-loan virtual meeting
- ▶ On-site training by MATC or Resource Center
- ▶ Mid-Loan period virtual meeting
- ▶ Extract data & send to FHWA for analysis
- ▶ Post-loan virtual briefing to go over results & describe your experience with the technology
- ▶ Lessons Learned document (for some loans)
- ▶ Return equipment to FHWA



# Recent Work in the Northeast

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- ▶ Site visits
  - VT 2021
  - NH & CT 2023
  - NJ 2024
  - ME 2025
- ▶ Equipment loan
  - DPS – MassDOT 2021
  - DPS – CAP Lab 2023
  - SmartJig – NHDOT 2023
  - PMTP – NH 2024





# Key Items from Recent Work

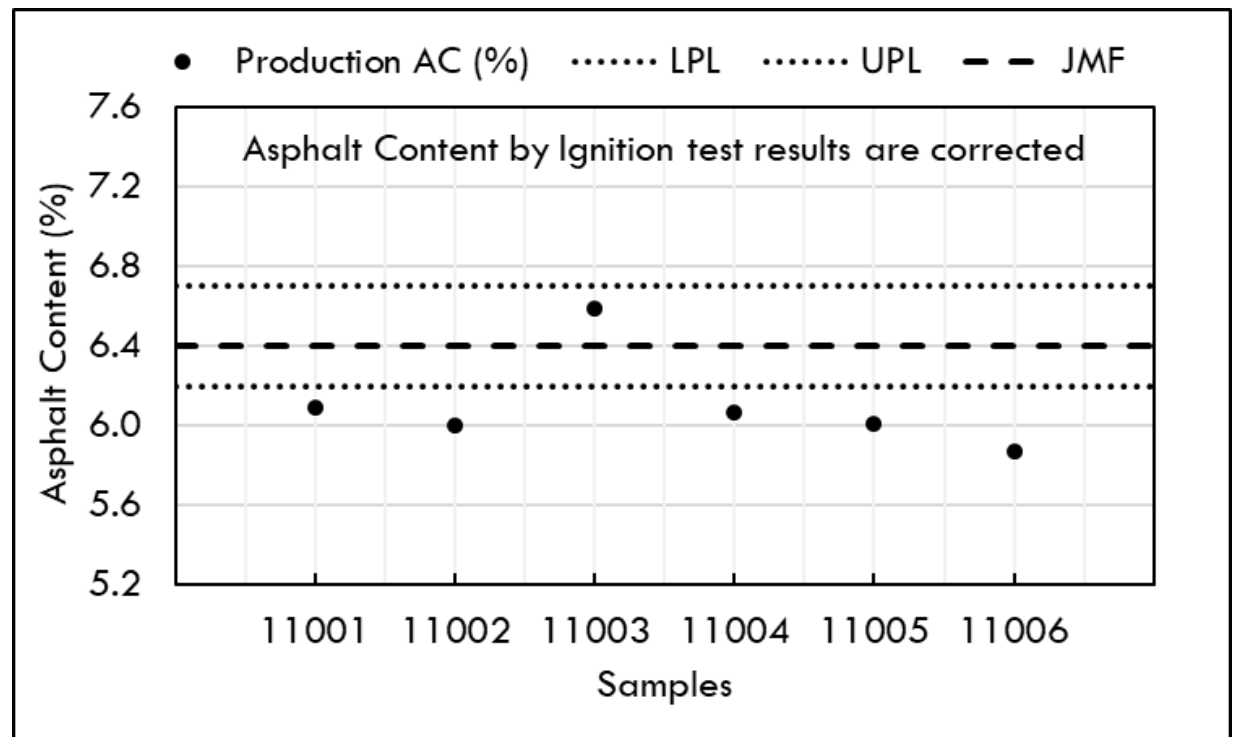
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- ▶ Asphalt materials fundamentals
- ▶ Balanced Mix Design
- ▶ Macrotexture for safety
- ▶ Tools for QC of mix placement

# Fundamentals

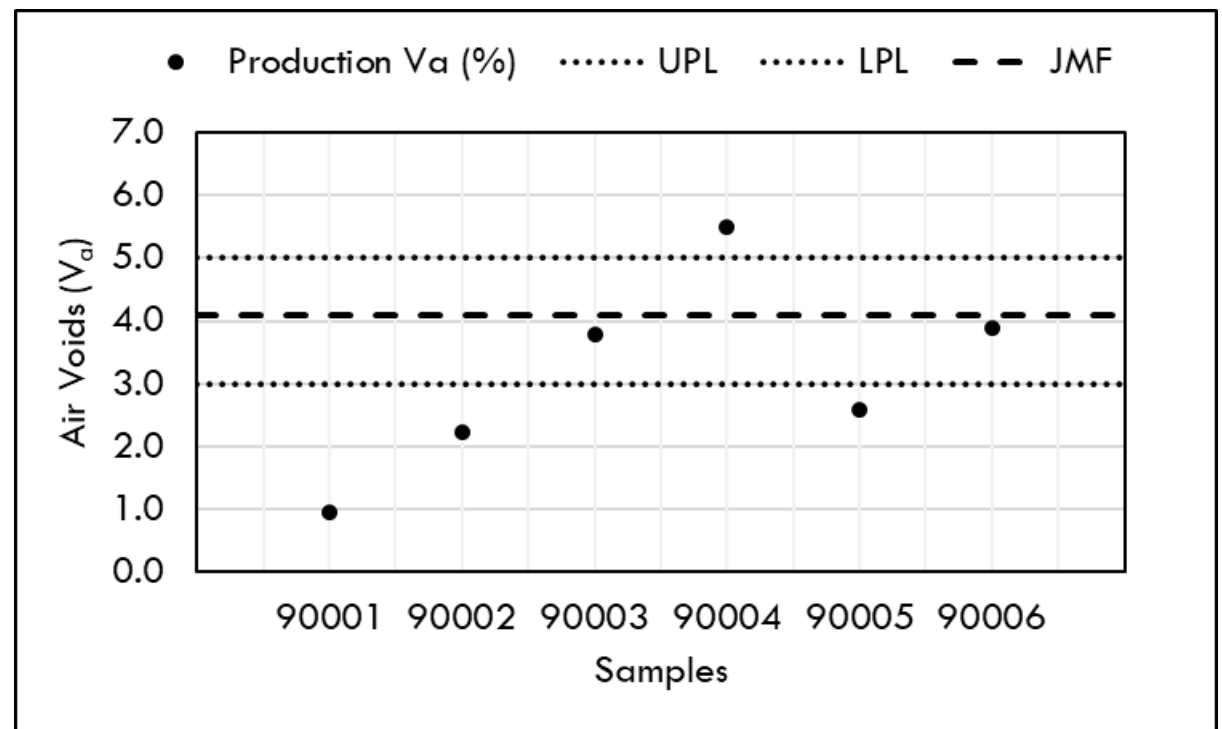
# Fundamentals still matter...

- ▶ Industry moving towards BMD but lessons we have learned still apply!
- ▶ Accurate measurements of mixture properties maintains consistency.



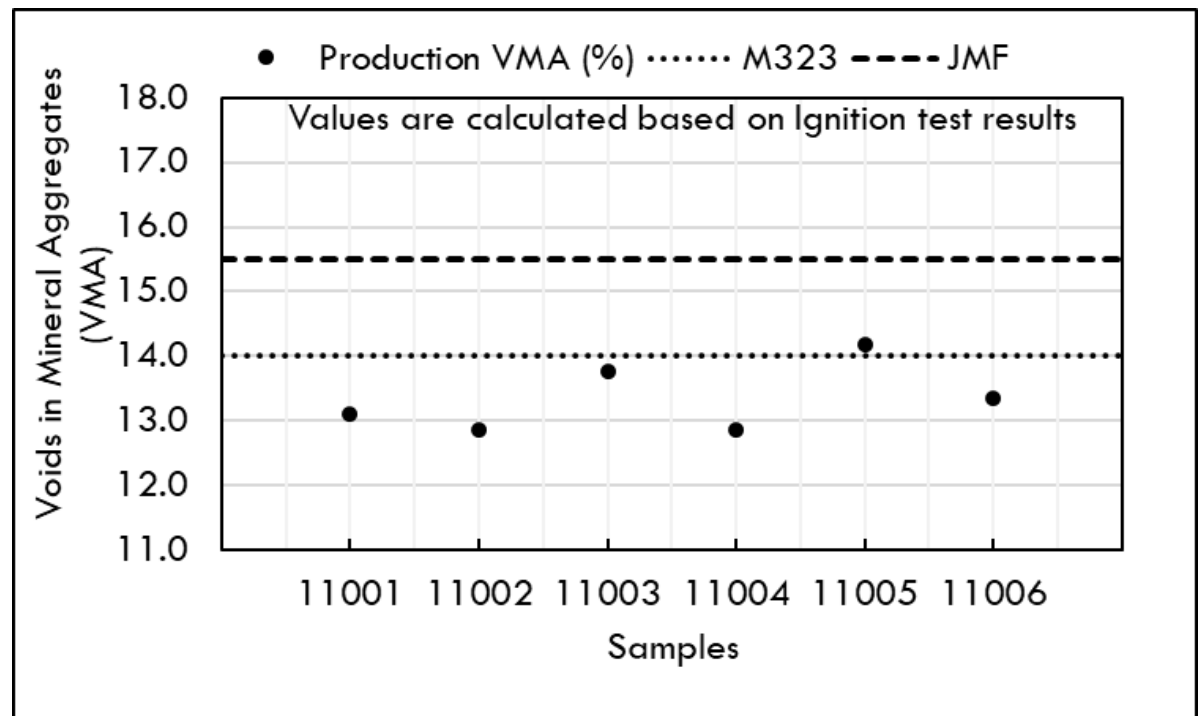
# Fundamentals still matter...

- ▶ Volumetric properties still matter
- ▶ Improved over measures of weights only – account for absorptions and gravities.



# Fundamentals still matter...

- ▶ Differences between lab mix design and the real world...
- ▶ Is the mix you designed/approved the same one that is being produced?



# Fundamentals still matter...

- ▶ Dust makes a big difference on the meaning of volumetric properties

